

A.3.2 SOLAR AND HELIOSPHERIC PHYSICS

1. Scope of Program

1.1 Introduction

Proposers to this program element should read Section A.3.1 of this Appendix for an overview of the Sun-Earth Connection (SEC) science theme of the NASA Office of Space Science.

The Solar and Heliospheric Physics program has as its objective the comprehensive study of all five solar and heliospheric research areas, namely the:

- Solar interior,
- Solar disk,
- Solar atmosphere,
- Inner heliosphere, and
- Outer heliosphere,

through two main research thrusts, one characterized by nonflight research that may be carried out in the office, observatory, or laboratory setting (see subsection 1.2 below) and one carried out by experiment hardware carried as the primary payload on balloons, sounding rockets, or as secondary, rocket-class payloads carried on the NASA Space Shuttle or other flights of opportunity (see subsection 1.3 below).

The driving force behind changes in the Solar System is the varying output of radiation, particles, and magnetic fields from the Sun that has time scales of seconds to billions of years. The origin of this variation is the Sun's magnetic cycle and the chaotic interactions of the fields that are generated. The Solar and Heliospheric Physics program seeks to understand the origins of this solar variability, its effects on the solar atmosphere and the heliosphere, and the transport and dissipation of matter and energy through the solar atmosphere to the outer edges of the heliosphere. These studies are supported to enable the achievement of the NASA Space Science Enterprise's strategic goals and objectives. The primary sources for the specific strategic vision of the Solar and Heliospheric Physics program are the "Quest": *Why does the Sun vary?* and *How do the Sun and galaxy interact?* of the Sun-Earth Connection roadmap online at <http://www.lmsal.com/sec/>. Efforts focused on those particular aspects of the Sun-Earth system that directly affect life and society are not appropriate for the Solar and Heliospheric Physics program, but may be submitted to the Living with a Star Targeted Research and Technology program described in Appendix A.3.7.

1.2 Solar and Heliospheric Physics Supporting Research and Technology (SR&T)

For purposes of program balance, the NASA Solar and Heliospheric Physics program element is organized into a matrix of five techniques, viz.,

- Development of Instrument Concepts (but not major space flight instruments *per se*),
- Ground- and Space-based Observations,
- Theory or Modeling,
- Data Analysis, and
- Ancillary Laboratory Research (e.g., derivation of atomic constants, photometric calibrations, or simulation of solar and heliospheric phenomena),

for each of the five solar and heliospheric research areas noted above in Subsection 1.1 above. Science research investigations in all matrix categories are invited.

This SR&T program supports investigations involving analyses of existing data or the development of computer programs that are or will be demonstrably available in the public domain. Acceptable SR&T investigations include the development of theoretical models and numerical simulation techniques pertinent to solar and heliospheric physics, and, in special cases, the development or coordination of solar and heliospheric ground-based observing capabilities that support NASA Solar and Heliospheric Physics flight programs.

Proposals that seek to explore and demonstrate concepts for new instruments for future suborbital or orbital flight opportunities are especially welcome. Although no priorities are imposed on these categories, an ideal program is envisaged as a balance among them, consistent with the quality of submitted proposals and their relevance to the current Solar and Heliospheric Physics flight programs.

To aid in the identification of peer reviewers, it is essential that the electronically submitted proposal Cover Page for Solar and Heliospheric Physics proposals include a single choice of descriptor (e.g., Theory or Modeling/Solar Atmosphere; Ground-based Observations/Solar Interior; Data Analysis/Inner heliosphere; etc.) as the "Technique/Research Area" designation that will appear on the Web site format (see NASA *Guidebook for Proposers* for directions).

As part of a mission-oriented agency, the Sun-Earth Connection theme seeks to fund those efforts that directly impact NASA missions or interpretation of their data. Other investigations, even if of considerable merit, will not be given high priority for funding through this NRA if they are judged to be more appropriate for submission to other Federal agencies.

Proposals are expected to present within their Scientific/Technical/Management Section a clear description of a specific scientific problem, a description of how the attack on this problem will be carried out, and an estimation of the anticipated achievement during the period of performance. It will be to the advantage of the proposer to explain the relation

of the proposed effort to any other significant current and pending support of an apparently similar nature.

The Solar and Heliospheric Physics SR&T program supports investigations involving analyses of existing NASA space mission data only from research quality databases that are open in the public domain. For non-NASA missions, preference will be given to those proposals intending to utilize open databases. For investigations using restricted data, the proposer must submit a letter from the experiment PI confirming that that data will be made available for the proposed SR&T work.

1.3 Low Cost Access to Space Program in Solar and Heliospheric Physics

The Solar and Heliospheric Physics Low Cost Access to Space (LCAS) Program is expected to continue to lead the way in the development of instrument concepts for future solar and heliospheric missions using a variety of methods for providing low cost access to space. These methods include standard and long-duration balloons, sounding rockets, Shuttle-based carriers, and sounding rocket-class payloads flown as secondary payloads or on other flights of opportunity. It is emphasized that a proposal for the Solar and Heliospheric Physics LCAS program must be for a complete science investigation, including data analysis and publication of results, even if these activities are projected to be done beyond the nominal three year period of performance. In a case like this, a follow-on proposal must be submitted for full peer review that documents the progress made in developing, if not flying, the payload, and that projects the steps necessary for data acquisition and reduction, and the publication of results.

2. Programmatic Information

Currently, the Solar and Heliospheric Physics SR&T program has a distribution of one-, two-, and three-year grants that leaves a portion of the program available for competition each year. Total SR&T program funds in Fiscal Year (FY) 2003 of \$7.9M will support approximately 90 grants, of which about 30 will have expired by FY 2004, freeing a corresponding portion of the funds for proposals competing under this ROSS-2002 NRA.

The Solar and Heliospheric Physics LCAS Program has approximately \$1.2M available for selections made through this ROSS-2002 NRA of three to four suborbital investigations of up to three years duration each beginning in early FY 2004.

IMPORTANT INFORMATION

As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) is now using a single, unified set of instructions for the submission of proposals. This material is contained in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement – 2001* (or *NASA Guidebook for Proposers* for short) that is accessible by opening URL <http://research.hq.nasa.gov>, and linking through the menu item "Helpful References," or may be directly accessed online at URL <http://www.hq.nasa.gov/office/procurement/nraguidebook/>. This NRA's Summary of Solicitation also contains the schedule and instructions for the electronic submission of a *Notice of Intent* (NOI) to propose and a proposal's *Cover Page/Proposal Summary*, which now also includes the required *Budget Summary*, and the mailing address for the submission of a proposal.

Questions about this program element may be directed to any of the cognizant Discipline Scientists:

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